

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An unwinding device for unwinding reels of web material wound around a central shaft and delivering said web material to a converting line, comprising:

- supports to support at least a reel in an unwinding position;
  - at least a peripheral drive mechanism which acts on ~~the~~ a cylindrical surface of the reel being unwound and peripherally transmits to said reel a torque to draw ~~it~~ the reel in rotation;
  - at least a center drive mechanism which transmits centrally to said reel an auxiliary torque to draw ~~it~~ the reel in rotation in combination with the torque transmitted by said peripheral drive mechanism;
  - a control system to reciprocally coordinate operation of said peripheral drive mechanism and of said center drive mechanism; and
- ~~characterized by comprising~~ a detection system to detect, during unwinding, ~~any~~ angular displacement of ~~the~~ an outermost web material on the reel in relation to the central shaft of the reel, ~~the~~ operation of said center

drive mechanism being controlled so as to correct said angular displacement.

2. (Currently Amended) Device according to claim 1, ~~characterized in that~~ wherein said control system controls at least an operating parameter of the center drive mechanism as a function of ~~the~~ unwinding conditions.

3. (Currently Amended) Device according to claim 2, ~~characterized in that~~ wherein said control system controls ~~the~~ speed of the center drive mechanism.

4. (Currently Amended) Device according to ~~one or more of the preceding claims, characterized in that the~~ claim 1, wherein speed of said peripheral drive mechanism is controlled so as to maintain a set value of tension of the web material delivered by said reel, a tensioning sensor being associated with said control system.

5. (Currently Amended) Device according to claim 2, ~~characterized in that~~ wherein said control system controls the auxiliary torque applied by said center drive mechanism.

6. (Currently Amended) Device according to claim 5, ~~characterized in that~~ wherein said control system is programmed to maintain the auxiliary torque applied by said center drive mechanism within a predetermined interval of values or at a predetermined value.

7. (Currently Amended) Device according to ~~one or more of the preceding claims, characterized in that~~ claim 3, wherein said control system acts on the speed of the center drive mechanism to correct said angular displacement.

8. (Currently Amended) Device according to ~~one or more of the preceding claims, characterized in that it comprises:~~ claim 1, further comprising a first sensor to detect at least a first reference integral with the central shaft of said reel; and a second sensor to detect at least a second reference applied to the web material of the reel.

9. (Currently Amended) Device according to claim 8, ~~characterized in that~~ wherein said second sensor is carried by a supporting arm of the peripheral drive mechanism.

10. (Currently Amended) Device according to ~~one or more of the preceding claims, characterized in that it comprises~~ claim 1, further comprising a sensor to detect ~~the~~ a diameter of said reel, associated with said control system.

11. (Currently Amended) Device according to claim 10, ~~characterized in that~~ wherein said control system is programmed to control the center drive mechanism giving ~~it~~ the center drive mechanism an angular rotation speed determined as a function of ~~the~~ speed of the peripheral drive mechanism and of the diameter of the reel.

12. (Currently Amended) Device according to claim 11, ~~characterized in that~~ wherein said control system is programmed to produce a feedback signal on said center drive mechanism, said feedback signal modifying ~~the~~ operation of the center drive mechanism as a function of ~~the~~ unwinding conditions.

13. (Currently Amended) Device according to ~~one or more of the preceding claims,~~ ~~characterized in that~~ claim 12, wherein said feedback signal is a function of said angular displacement.

14. (Currently Amended) Device according to ~~claims 6 and 12,~~ ~~characterized in that~~ claim 12, wherein said feedback signal is a function of ~~the~~ a value of the auxiliary torque applied to the reel by said center drive mechanism.

15. (Currently Amended) Device according to ~~one or more of the preceding claims,~~ ~~characterized in that~~ claim 1, wherein said peripheral drive mechanism comprises a belt and means which press said belt on ~~the~~ a cylindrical external surface of the reel being unwound.

16. (Currently Amended) Device according to ~~one or more of the preceding claims,~~ ~~characterized in that~~ claim 1, wherein said center drive mechanism comprises a shaft

equipped with coupling means engageable and disengageable in relation to the central shaft of the reel.

17. (Currently Amended) Device according to claim 16, ~~characterized in that~~ wherein said coupling means comprise a grooved coupling.

18. (Currently Amended) Device according to claim ~~16~~ or 17, ~~characterized in that~~ 16, wherein said shaft is axially mobile to engage and disengage from the central shaft of the reel.

19. (Currently Amended) Device according to claim 18, ~~characterized in that~~ wherein said shaft is supported in a sleeve which slides axially inside a tubular element, said tubular element constituting ~~the~~ a cylinder of a piston-cylinder actuator, of which said sleeve forms ~~the~~ a moving piston.

20. (Currently Amended) Device according to claim 19, ~~characterized in that~~ further comprising a first gear ~~is~~ splined on said shaft, meshing with a second gear ~~the~~ toothing of which has an axial length sufficient to maintain the ~~two gears~~ first gear and the second gear in contact in any axial position of the shaft.

21. (Currently Amended) Device according to ~~one or more of the preceding claims, characterized in that it~~ comprises claim 1, wherein said supports include dual

central end supports for at least two approximately axially aligned reels, with the center drive ~~mechanisms~~ mechanism for one and for ~~the other~~ another of said reels being disposed between the dual central end supports for the two reels.

22. (Currently Amended) Device according to ~~one or more of the previous claims, characterized in that~~ claim 1, wherein said control system is programmed to disconnect one or ~~the other~~ another of the peripheral drive mechanism and the center drive ~~mechanisms~~ mechanism.

23. (Currently Amended) A method for unwinding a reel of web material and delivering said web material to a converting line, ~~in which~~ comprising applying a first unwinding torque ~~is applied~~ peripherally to said reel through contact means with ~~the~~ a cylindrical surface of the reel, ~~and applying~~ a second unwinding torque ~~is applied~~ to ~~the~~ a shaft of said reel, ~~wherein~~ said first unwinding torque and said second unwinding torque ~~are being~~ reciprocally coordinated, ~~characterized in that any detecting~~ angular displacement of ~~the~~ an outermost web material wound on said reel in relation to the shaft of the reel, ~~is detected and that the~~ controlling a center drive mechanism ~~is controlled~~ as a function of said angular displacement.

24. (Currently Amended) Method according to claim 23, ~~characterized in that~~, wherein a peripheral drive mechanism is arranged in contact with the cylindrical surface of the reel and said applying of said first unwinding torque is ~~applied~~ through said peripheral drive mechanism; ~~a~~ said center drive mechanism is arranged in connection with the shaft of the reel and said applying of said second unwinding torque is ~~applied~~ through said center drive mechanism.

25. (Currently Amended) Method according to claim 24, ~~characterized in that~~ further comprising controlling at least an operating parameter of the center drive mechanism ~~is controlled~~ as a function of ~~the~~ unwinding conditions of the reel.

26. (Currently Amended) Method according to claim 25, ~~characterized in that the~~ further comprising controlling rotation speed of said center drive mechanism ~~is controlled~~.

27. (Currently Amended) Method according to claim 24 ~~or 25, characterized in that~~, wherein the peripheral drive mechanism is controlled so as to maintain ~~the~~ tension of the web material delivered from said reel at a set value.

28. (Currently Amended) Method according to ~~one or more of the claims from 24 to 27, characterized in that~~ claim 23, wherein the second unwinding torque, applied to the shaft of the reel by said center drive mechanism, is

controlled as a function of ~~the~~ unwinding conditions of the reel.

29. (Currently Amended) Method according to claim 28, ~~characterized in that~~ wherein the second unwinding torque applied to the reel is controlled so as to maintain ~~it~~ the second unwinding torque within a pre-established interval or a pre-established value.

30. (Currently Amended) Method according to ~~one or more of claims 24 to 29, characterized in that it comprises the phases of~~ claim 24, comprising:

- detecting during rotation of said reel at least a first reference integral with the ~~center~~ shaft of said reel;
- detecting during rotation of said reel at least a second reference applied to the web material wound on said reel;
- detecting any variation in ~~the~~ angular distance between said first reference and said second reference and producing a feedback signal as a function of said variation;
- modifying an operating parameter of said center drive mechanism as a function of said feedback signal.

31. (Currently Amended) Method according to claim 30, ~~characterized in that~~ wherein said first reference and said second reference are detected and said variation is determined at each turn of the reel.



32. (Currently Amended) Method according to claim ~~30~~ or ~~31~~, characterized in that 31, wherein said first reference is applied to each turn of the web material wound on said reel, the ~~references~~ first reference and the second reference on each turn being originally aligned along a same angular position.

33. (Currently Amended) Method according to ~~one or more of the claims from 24 to 32~~, characterized in that: claim 24, wherein

- said peripheral drive mechanism is operated at a peripheral speed;
- ~~the~~ diameter of the reel is detected;
- an angular speed is calculated from said peripheral speed and from said diameter;
- the center drive mechanism is driven at said angular speed.

34. (Currently Amended) Method according to claim 33, ~~characterized in that~~ wherein a feedback signal is produced to control said center drive mechanism, said feedback signal modifying ~~the~~ operating conditions of the center drive mechanism as a function of ~~the~~ unwinding conditions of the reel.

35. (Currently Amended) Method according to claim ~~29~~ and ~~34~~, characterized in that 34, wherein said feedback

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signal is produced as a function of said angular displacement.

36. (Currently Amended) Method according to ~~claims 29 and 34~~, characterized in that claim 34, wherein said feedback signal is produced as a function of the second unwinding torque applied to said reel by said center drive mechanism.

37. (Currently Amended) Method according to ~~one or more of the claims from 24 to 36~~, characterized in that claim 24, wherein said first unwinding torque is controlled so as to maintain ~~the~~ tension of the web material unwound from said reel substantially constant.